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ABSTRACT

The purpose of this study was to state several desired teacher behaviors relative to the development of cognitive skills in young children and to determine the extent to which those behaviors could be achieved. The study involved 16 students in a graduate course, all of whom were currently or had been teachers. Each graduate student recorded a lesson conducted with children on audio cassette tape both before the first class and after completing 14 weeks of instruction in the course. Interaction forms were used to analyze teacher behaviors on the tapes. The results of the interaction forms were compared with respect to each of the following variables: (a) teacher telling vs. teacher asking, (b) use of open questions vs. closed questions, (c) student inferences and support for student inferences, and (d) ratio of teacher talk to student talk. Results showed that the course produced significant increases in (a) the amount of teacher questioning, (b) teacher use of open-ended questions, and (c) causing students to make and support inferences; and significant decreases in teacher telling and teacher use of closed questions. There was no significant difference in the effort to sustain a two-to-one ratio of student talk to teacher talk. (PB)

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AN INVESTIGATION OF THE EFFECTS OF A GRADUATE COURSE ON THE MODIFICATION OF TEACHER BEHAVIOR

Edward D. Watson

A great deal of writing in educational literature indicates that many educators are in agreement that children need to learn how to think. Children learn to think in a climate of interaction and inquiry where they are actively involved with teachers and other children in experiences which require them to think and verbalize their thoughts. The development of cognitive skills does not occur simply through chance, or by random use of pre-packaged materials.

Knowledgeable teachers, capable of processing the skills necessary to provide learning activities which foster intellectual growth, play a significant role in the development of cognitive skills in children. Hilda Taba, Irving Sigel and others have found that the skills of the teacher are a major factor in the development of cognitive skills. Implicit in these teaching skills is competency in implementing teaching strategies designed to induce cognitive growth. Taba reported that:

> It seems evident that the impact of cognitive processes of the specific teaching strategies is greater than the impact of the curriculum guide which only gives general sequences of learning experiences and generic teaching strategies. . . . This conclusion reinforces the general impressions that unless teaching methods consistent with the innovative curriculum are used in the classroom, that curriculum becomes diluted, misused, and ineffectual. The most important observation that can be made from the data collected in this study is the centrality and power of the teacher's role in initiating cognitive operations determining which kinds are open to

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students. From that follows the importance of implementing curriculum innovations that focus on behavioral objectives by making adequate teaching strategies available to the students.[1]

Sigel states that:

> The strategy suggested here is important; it requires the child to discover the attributes relevant for discussion, rather than the teacher supplying them. The multiple labeling and multiple classification are accomplished by the teacher providing the materials and asking the child to discover the relationships. From our research efforts it has become clear that letting the child provide the labels and discover the similarities and differences enables him to assimilate this information more readily, and to achieve an awareness of the complexity of items before him. This conclusion is consistent with Piagetian theory, which holds that assimilation of information leads to alterations in the point of view. . . . Our evidence is sufficiently strong to warrant the generalization that using a discovery-tape approach, guided by the teacher, is better than other methods.[2]

Sigel notes further that, "The process of discovery of commonalities through labeling and identifying is crucial. The gains are lost if the teacher sets himself up as the source of such information."[3]

THE PROBLEM

Teacher behaviors which contribute to the development of cognitive skills in children include: the ability to limit the amount of teacher telling; the ability to ask questions which permit divergent responses; the ability to cause children to make and support inferences; and the ability to maintain a relatively low ratio of teacher talk as compared with the amount of student talk. For many years teacher

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[1]Hilda Taba et al., Thinking in Elementary School Children (U.S.O.E., Cooperative Research Project No. 1574, 1964). p. 182.

[2]Irving E. Sigel, Part IV, Child Development and Social Science Education, Publication No. 113, Social Science Education Consortium (Detroit: March, 1966).

[3]Ibid.

education has given high priority to the development of skills necessary for effective teaching of critical thinking. There is little objective data to support the contention that teacher training programs have been successful in this endeavor.

It was the purpose of this study to state several desired teacher behaviors relative to the development of cognitive skills in young children, and to determine the extent to which those behaviors are achieved. The four hypotheses formulated for this study follow.

HYPOTHESES

The study was designed as a test of four hypotheses stated in null form:

1. There is no significant difference in teacher behavior of sustaining a ratio of five to one of teacher asking to teacher telling when the teacher training situation is designed to effect such change.
2. There is no significant difference in teacher behavior of maintaining a ratio of five to one of open-ended questions to closed questions when the teacher training situation is designed to effect such change.
3. There is no significant difference in teacher behavior of causing children to make inferences and to support those inferences at least eighty per cent of the time when the teacher training situation is designed to effect such change.
4. There is no significant difference in teacher behavior in maintaining a two to one ratio of student talk to teacher talk when the teacher training situation is designed to effect such change.

SAMPLE

The sample comprised sixteen students in a graduate level course designed to prepare teachers of young children to implement a systematic program to help children ages four to eight to develop initial cognitive skills. The sixteen graduate students included teacher of nursery school classes, elementary school teachers, high school teachers, and former teachers who planned to return to the classroom. The course content is based on Piagetian principles and derived largely from the research of Dr. Irving E. Sigel at the Merrill-Palmer Institute in Detroit. The Institute for Staff Development, a private organization, in consultation with Dr. Sigel developed a teacher training program called BASICS (Building and Applying Strategies for Initial Cognitive Skills). This program was implemented as a graduate level course at Trenton State College and conducted during the Spring Semester, 1973-1974.

PROCEDURE

Each graduate student recorded on audio cassette tape a lesson conducted with children prior to the first meeting of the graduate course. This pre-tape was submitted to the instructor at the first class meeting. Each student recorded on audio cassette tape a lesson conducted with children after fourteen weeks of instruction in the course. Interaction forms were used to analyze teacher behaviors on the pre-tapes and the post-tapes.

In the analysis of the data, the null hypotheses were tested by comparing the results of the pre and post tape interaction forms with respect to each of the following variables: (1) teacher telling - teacher asking; (2) use of open questions - closed questions;

(3) student inferences - support for student inferences; and (4) ratio of teacher talk - student talk. Statistical significance was tested by means of a t test. Initial and final mean scores, and t tests of the significance of difference between means were computed.

FINDINGS

Results from the pre- and post- tapings are presented in Table 1.

TABLE 1

Initial and Final Mean Teacher Behavior Scores

Teacher Behavior	Initial Mean	Final Mean	Difference	t-Test
Teacher telling	25	4.95	20.06	4.31*
Teacher asking	29.44	49.06	19.62	4.22*
Open questions	13	46.25	33.25	6.17*
Closed questions	16.44	2.81	13.63	5.30*
Student inferences	1.44	23.44	16.30	4.78*
Student support for inferences	.50	20	19.50	7.01*
Ratio of teacher talk	.498	.479	.018	.823

15 d.f.

N = 16

*Significant at .001 level

The findings of the investigation may be summarized as follows:

1. The course produced a significant increase in the amount of teacher questioning.
2. The course produced a significant decrease in teacher telling.
3. The course produced a significant increase in teacher use of open-ended questions.

4. The course produced a significant decrease in teacher use of close questions.

5. The course produced a significant increase in causing students to make inferences.

6. The course produced a significant increase in causing students to support their inferences.

As a result of these significant differences, the first three null hypotheses relating to teacher behavior were rejected.

7. The course did not produce a significant difference in sustaining a two to one ratio of student talk to teacher talk.

As a result, the fourth null hypothesis was not rejected.

CONCLUSIONS

The findings of this investigation seem to support the following conclusions:

1. The course accomplished the stated objective of teacher behavior of sustaining a ratio of five to one of teacher asking to teacher telling.

2. The course accomplished the stated objective of teacher behavior maintaining a ratio of five to one of open-ended questions to closed questions.

3. The course accomplished the stated objective of teacher behavior of causing children to make inferences and to support those inferences at least eighty per cent of the time.

4. The course did not accomplish the stated objective of teacher behavior of maintaining a two to one ratio of student talk to teacher talk.

IMPLICATIONS OF THE STUDY

Several implications may be drawn from this study regarding the effects of graduate course work on the modification of teacher behavior. Graduate courses with stated objectives which purport to modify teacher behavior relative to the development of cognitive skills in children are capable of achieving those objectives. Professors who teach such courses can implement techniques which will produce many of those teacher behaviors, and the extent which those behaviors were achieved can be measured. Further investigation into competency based teacher education involving the teaching of cognitive skills is critically needed. With increased attention to the teaching of critical thinking in children, a fresh look at learning experiences at the teacher training level becomes more and more pressing. Evidence is available which indicates that the level of skill development in teachers may be increased. To what extent other approaches to teacher training can promote higher levels of teacher competency in the development of cognitive skills in children more efficiently and effectively can only be disclosed through continued investigation.

REFERENCES

1. Sigel, Irving E. Child Development and Social Science Education, Part IV. Publication No. 113 of the Social Science Education Consortium. Detroit: The Merrill-Palmer Institute of Human Development and Family Life, 1966.

2. Taba, Hilda, et al. Thinking in Elementary School Children. Cooperative Research Project No. 1574, Office of Education, U S Department of Health, Education and Welfare (Washington, D. C.: Government Printing Office, 1964).